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MORRISON & FOERSTER LLP
1650 TYSONS BOULEVARD
SUITE 400
MCLEAN, VA 22102

EXAMINER	
PAUL, ANTONY M	
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2837	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/588,289	CLOTHIER ET AL.	
	Examiner	Art Unit	
	ANTONY M. PAUL	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 thru 5, 8 thru 16, 18, 19, 20 and 28 thru 31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _ is/are allowed.

6)☒ Claim(s) *1 thru 5, 8, 9, 10, 13 thru16, 18, 19, 20, 30 and 31* is/are rejected.

7)☒ Claim(s) *11,12,28 and 29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 August 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections – 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-5, 8, 18, 19, 20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto (2003/0121685 or Patent no 7,007,762) in view of Ookawa et al. (5,796,226).

Claims:	**Yamamoto + Ookawa et al. teaching**
Claim 1: A controller of an electrical machine having a rotor and at least one electrically energisable phase winding,	Figs.2-4 shows a controller IC 173 (figs 2, 4) controls a DC brushless motor 121 via a motor driving circuit 151, where the motor 121 have a rotor 127 (fig.3) and at least one phase winding 125U (figs.2, 3),
the controller configured to apply a single predetermined angle correction factor to a portion of a predetermined advance angle profile covering a range of different rotor speeds,	The controller 173 applies a single predetermined advance angle correction factor 2.1 degree to a battery voltage portion 10.2V and current portion 2A among the predetermined advance angle mapping data included (fig.5) in the advance angle map 191 (advance angle is defined as the degree of the phase angle to be corrected, see [0021], lines 1-10; see also Para's.[0041] thru [0043], [0047], [0048]), where controlling the advance angle is based on the rotational speed the motor 121 (see [0021], lines 19-22; advance angle determined based on rotational speed of the rotor, see claim 3) and covering a range of rotor speeds is obvious in that it depends on the rotational speed setting by a speed changing

	mechanism 105 of the power tool 101 driven by the motor 121 (see [0027], fig.1)
wherein the predetermined advance angle profile represents energisation of the phase winding with respect to angular position of the rotor over a range of rotor speeds.	The controller IC 173 includes the predetermined advance angle map 191 (stored in memory 173d, see fig.4 & [0042]), which represents energisation of the phase winding [125 or 125 V or 125 W] of the motor 121 such as by providing predetermined optimum advance angles (which corresponds to the respective battery voltages and currents shown in fig.5) to the drive control device 151, which energize the phase coil 125 U (or 125V or 125 W) of the motor 121 via a drive circuit 157 and the energisation of the phase winding coil (125 U or 125V or 125 W) is based on detecting the position of the rotor 127 by the rotor position detecting circuit 155 (see fig.2 & [0031]) and the limitation "over the range of rotor speeds" is obvious in that it depends on the rotational speed setting by a speed changing mechanism 105 of the power tool 101 driven by the motor 121 (see [0027], fig.1). Yamamoto does not mention covering a range of rotor speeds. Ookawa et al. shows in fig. 19 advance angle correction for a range of speeds [0 to 8400 rpm] of the rotor [R] of the motor [1] (figs.1a, 18-19 & col. 15, lines 29-49, col. 16, lines 6-36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have range of rotor speeds of Ookawa et al. in the system of Yamamoto because level of noises is declined to produce smooth rotation of rotor at various rotational speed (see col. 3, lines 40-42, lines 52-54).
Claim 8: A method of controlling an	Fig. 2 shows a control device 151 controls

electrical machine having a rotor and at least one electrically energisable phase winding, comprising:	a dc motor 121 having a rotor 127 (fig.3) based on predetermined advance angle control information received from a controller IC 173 and the motor 121 has at least one energisable phase winding coil 125U (figs. 2-3),
providing a control map comprising a predetermined advance angle profile and a predetermined angle correction factor to a controller as claimed in claim 1, 2 or 4 for the electrical machine,	a control map 191, which comprises predetermined advance angle profile (fig.5) including the predetermined advance angle correction factor such as 2 degree (corresponding to battery voltage of 10.2V and battery current of 2 A, see fig.5) is applied to the control device 151 by a controller IC 173 for driving the motor 121,
storing the control map in a memory in the controller and using the controller to control the electrical machine based on the stored control map.	controller IC 173 stores the control map 191 in the memory such as ROM 173d in the controller IC 173 (fig. 4), which controls the motor 121 based on the advance angle control information stored in the control map 191 (fig5).
Claim 18: An electrical machine incorporating a controller as claimed claim 1, 2 or 4.	Read on to the control device 151 (or controller IC 173), which connect to control the motor 121 (fig.3)
Claim 30: A control map controller as claimed in claim 1, wherein the predetermined angle correction factor further depends on an input voltage.	Read on to the predetermined advance angle correction factor depending on the battery voltage (see fig.5)

In regard to claims 2 and 4, Yamamoto shows in fig. 5 a predetermined advance angle profile such as the advance angle map 191, but do not mention on-advance angle data (or off advance angle for claim 4) for the range of different rotor speeds.

Ookawa et al. teaches advance angle profile such as a control map [13a, b, c] includes on/off angle data for a predetermined range of rotor speeds such the rotor revolutions shown in tables 1-2 of said map [13a, b, c] (col. 13, lines 23-67, col. 14, lines 1-34, col. 15, lines 20-66, col.16, lines 1-36, figs. 19, 21-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the on advance angle data of Ookawa et al. in the system of Yamamoto because level of noises is declined to produce smooth rotation of rotor at various rotational speed (see col. 3, lines 40-42, lines 52-54).

In regard to claim 3, Yamamoto teaches the controller IC173 is configured to apply the predetermined angle correction factor 2.1 or 2.4 or 2.7 (fig.5) but do not mention the said correction factor applied to the on-advance angle data.

Applying the advance angle correction factor to the on-advance angle data is obvious in that the predetermined optimum advance angles (fig.5) can be selected as the on advance angles.

In regard to claim 5, Yamamoto does not mention the controller is configured to apply the predetermined angle correction factor to the off-advance angle data.

Ookawa et al. teaches advance angle correction (fig. 19) for the off advance angle (energisation off angle is adjusted, see col. 3, lines 55-56, col. 4, lines 3-4, 12-19, 23-30, col. 5, lines 58-60, col. 15, lines 27-40 & col. 16, lines 6-36).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the predetermined angle correction factor to the off-advance angle data because generation of high level acoustic noises are prevented (see col. 3, lines 55-58).

In regard to claim 19, Yamamoto does not mention a switched reluctance motor. Ookawa et al. shows in (fig.1a) a machine such as a switched reluctance motor [1] (col.1, lines 55-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the switched reluctance motor of Ookawa et al. in the system of Yamamoto because the motor has advantages of a simple construction and is capable of operation under an elevated temperature (see col. 2, lines 7-9).

In regard to claim 20, Yamamoto does not mention a cleaning appliance incorporating said electrical machine.

A cleaning appliance incorporating an electrical machine is obvious in that an electrical motor is used in variety of cleaning appliances such as a vacuum cleaner is well known in the art.

3. Claims 9, 10, 13, 14, 15, 16 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto (2003/0121685 or Patent no 7,007,762) in view of Kaplan et al. (6,819,008).

Claims:	**Yamamoto + Kaplan et al. teaching**
Claim 9: A method of generating a control map for a controller of a machine having a rotor and at least one electrically energisable phase winding, the method comprising:	Read on to the advance angle mapping data generated in the control map 191 (fig.5) formed in the memory 173d of a controller IC 173 (fig.4), where the advance angle mapping data of the control map 191 is provided to the drive control device 151of a dc motor 121 having a rotor 127 (fig.3) and at least one phase winding 125U (or 125 V or 125 W), the method comprising:
producing an advance angle profile representing energisation of the phase winding with respect to the angular position of the rotor over a range of rotor speeds,	the advance angle mapping data is produced in the control map 191 (fig.5) of the controller IC, which provide the optimum advance angles (which are defined by the combination of battery voltage and current, see fig.5 & [0041-0043], [0048]) to the drive control device 151, where the drive circuit 157 of the

	control device 151 (fig.2) energize the phase winding coil 125U (or 125 V or 125 W) based on detecting the position of the rotor 127 by the rotor position detection circuit 155 (see [0031]), where controlling the advance angle of the motor 121 is based on the rotational speed the motor 121, which includes a rotor 127 (see [0021], lines 19-22; advance angle determined based on rotational speed of the rotor, see claim 3).
measuring input power to the machine; and	Read on to measuring the battery voltage by a voltage detector 175 (or measuring current by the current detector 179); and
producing a single correction factor for a portion of the advance angle profile covering a range of different rotor speeds,	Explained in claim 1
wherein the angle correction factor depends on a difference between the measured input power and a predetermined input power	read on to the advance angle correction factor (2.1/ 2.4/ 2.7, see fig. 5) depends on changes in respective battery voltage and current (advance angles determined in accordance with changes in battery voltage and current, see [0043]) Yamamoto does not mention covering a range of different rotor speeds. Kaplan et al. teaches a mapping technique covering different rotor 23 (fig.2) rotational speeds such as from 1000 rpm to 5000 rpm (see col. 7, lines 6-18) and teaches adjustment of conduction angles by a controller 78 based on a difference between actual measured output power and desired output power (see fig. 4 and col. 2, lines 24-31, col. 9, lines 6-8, 15-20 & lines 34-46). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the range

	covering different rotor speeds of Kaplan et al in the system of Yamamoto because a switched reluctance electrical machine is operated in an optimum manner to achieve high efficiency (see col. 1, lines 12-15).
Claim 13: A method as claimed in claim 9, 10 or 11, further comprising storing the angle correction factor in a memory associated with the controller.	the control map 191 including the predetermined advance angles is stored in the memory such as ROM 173d in the controller IC 173 (fig. 4) (see figs. 4-5).
Claim 14: A method as claimed in claim 9, 10 or 11, further comprising transmitting the angle correction factor to the controller by means of radio frequency signals.	Read on to the controller IC 173 have an output D/A (fig.2), which transmit predetermined advance angles in the form of analog signals to the drive control device 151 (via the input section 153b, see [0041], lines 8-12).
Claim 15: A method as claimed in claim 9, 10 or 11, wherein an input voltage applied to the phase winding is substantially constant.	Read on to any one of the battery voltage (corresponding to respective advance angle, fig.5) inputted to the phase winding 125U (fig.2).
Claim 31: A method as claimed in claim 9, wherein the angle correction factor further depends on an input voltage	Read on to the predetermined advance angle correction factor 2.1 depending on the battery voltage 10 V (see fig.5)

In regard to claim 10, a method as claimed in claim 9, wherein the winding is energised in accordance with the advance angle profile at a single predetermined speed, which speed is associated with the predetermined input power.

Fig. 2 shows the phase winding coil 125U (or 125V or 125W) energized using a drive control device 151 in association with the predetermined advance angles (correspond to respective battery voltages and currents, see fig.5) supplied by a controller IC 173 to the drive control device 173, where in controlling the advance angle of the motor 121 is based on the rotational speed of the motor (see [0021], lines 19-23) and speed is associated with the predetermined input power is obvious in that the

speed depends on the battery voltage or current applied to the phase winding coil 125 U (or 125V or 125 W) of the motor 121.

In regard to claim 16, a computer readable medium having a computer program stored thereon for controlling a machine in accordance with the method as claimed in claim 9, 10 or 11.

Yamamoto shows a computer readable medium such as CPU 173 of a controller IC 173 controlling a motor 121 (see figs 2, 4). Storing a computer program in a computer readable medium is obvious in that the CPU performs programmable instructions to various circuits within the controller IC 173.

Allowable subject matter

4. Claims 11, 12, 28 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

5. Applicant's arguments with respect to claims 1-5, 8-16, 18-20 and 28-31 have been considered but are moot in view of the new ground(s) of rejection. Objection to drawings and 112 rejection of claims 28 and 29 is withdrawn by the examiner based on correction of figures 3, 6 and 7 and amendment to claims 28 and 29.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTONY M. PAUL whose telephone number is (571)270-1608. The examiner can normally be reached on Mon - Fri, 7:30 to 5, Alt. Fri, East.Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benson Walter can be reached on (571) 272-2227. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BENTSU RO/
Primary Examiner, Art Unit 2837

/Antony M Paul/
Examiner, Art Unit 2837 12/04/2009